



# Injury Assessment vs. Risk Assessment



Introduction to NRDAR  
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National Forum on Tribal  
Environmental Science  
Ocean Shores, WA

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**Trustees need to know what's at risk before they can effectively determine what injuries are present.**



## **Ecological Risk Assessment**

**Screening-level**

**Problem Formulation**

**Study Design**

**Field Reconnaissance**

**Site Investigation**

**Risk Characterization**

**Risk Management**

**Remediation and Restoration Construction &  
Monitoring**

## **Natural Resource Damage Assessment**

**Pre-Assessment  
Screen**

**Assessment Plan**

**Injury Determination**

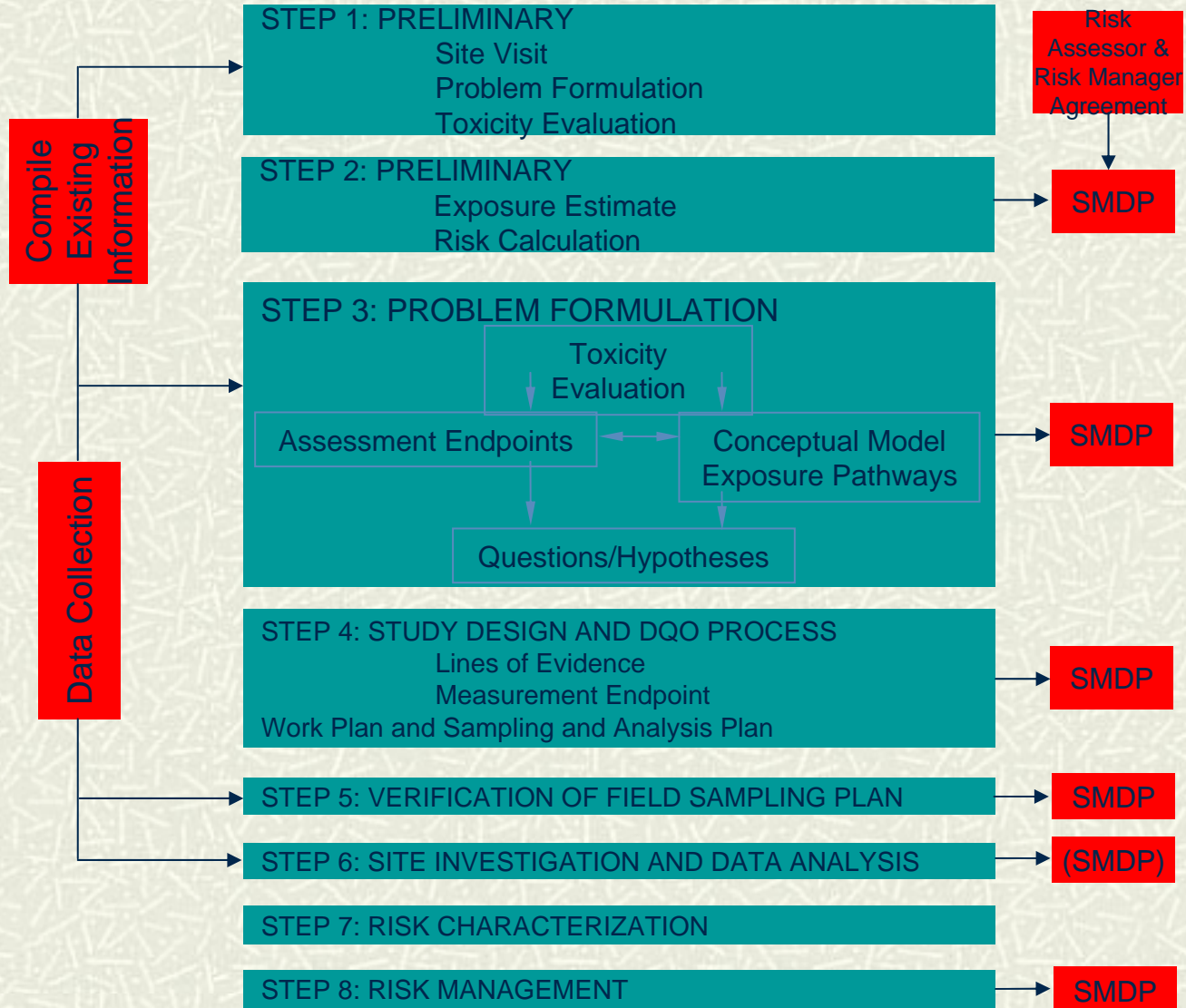
**Injury Quantification**

**Damage Assessment**

**Settlement**

**Remediation and Restoration Construction &  
Monitoring**

# 8-Step Ecological Risk Assessment Process





# Ecological Risk Assessment

- Identifies chemicals or chemical combinations present that exceed thresholds
- Determines threshold chemical concentrations expected to cause significant adverse effects
- Evaluates the potential risk to receptors from exposure to chemicals



# Ecological Risk Assessment (cont'd.)

- Identifies cleanup levels minimize or eliminate significant adverse effects
- Risk management decisions evaluates how the cleanup itself may impact biota
- Assesses expected residual risk to biota after cleanup; i.e. how clean is “clean?”



# What ERA usually doesn't do

- Doesn't validate what harm or injuries to natural resources are actually occurring
- Doesn't validate the extent or degree to which natural resources are actually being injured or harmed; i.e. how bad is it?
- Doesn't equate the nature and extent of injuries with the value of lost uses and services; i.e. "Damages"



# Questions to ask of an ERA

- Are all potential receptors considered?
- Are most sensitive life stages, conditions of receptors, or kinds of exposure considered?
- Are all significant indicators of harm considered
- Are all significant analytes considered?
- Are the cumulative effects of multiple chemical causes of harm considered in relation to the most sensitive receptor/life stage?



# Injury Assessment Strategy

Studies to validate injuries



Quantify lost uses



Calculate damages



Plan and Implement Restoration



Restore, replace, acquire the  
equivalent of *injured resource*

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Roughly estimate  
quantity of injured  
habitats



Miracles Can Happen



Restore, replace, acquire the  
equivalent of injured *habitats*  
*supporting resources*

*Or For Less  
Work*



## Injury Assessment

Evaluates the extent and degree to which injuries to natural resources (receptors) can be confirmed

Have natural resources:

- Been harmed (in the past)?
- Are they currently being harmed?
- How long will they continue to be harmed?



## Injury Assessment (cont'd)

- Studies evaluate the outcomes of the injury, e.g.,
  - Ability to survive
  - Shortened life span
  - Reduced reproduction
  - One or both sexes
- What natural resource uses and services are lost?

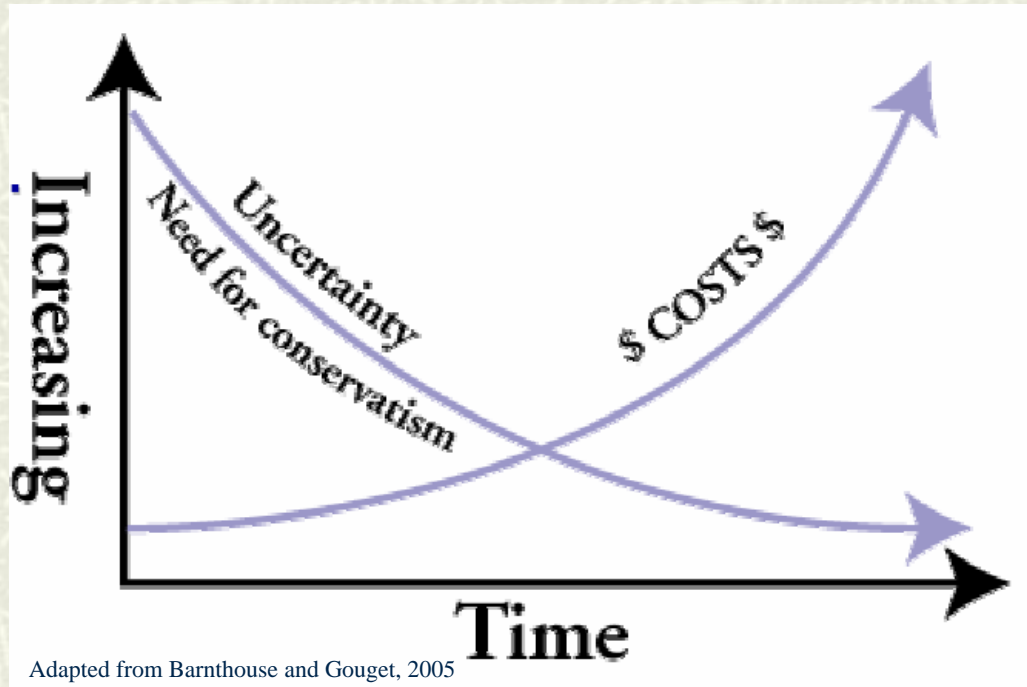


# Conservative Damage Assessment Approach

- Often, potentially-responsible parties have limited fiscal resources that they're willing to contribute to NRDARs
- Sometimes it's better to make reasonable estimates of injuries using available data and info to get an early settlement than to spend lots of time and money on injury assessment studies.



## Conservative Damage Assessment Approach (cont'd)





## Conservative Damage Assessment Approach (cont'd)

At some point, additional costs to get the most conservative case don't justify further investment in either risk or injury studies. The costs of litigation and costs to provide additional habitats may be too great.





## **Advantages to Integrating ERA and NRDAR Processes**

- Conceptual site model reflects common understanding of site
- Apply logical framework for ERA to NRDAR
- Clearly defined assessment and measurement endpoints



## **Advantages to Integrating ERA and NRDAR Processes (cont'd)**

- Strengthen the risk assessment through input from Trustees and Resource Managers
- Apply consistent approaches and tools in both processes
- Allow Trustees to determine NRDAR liability associated with various remedial options



# Integration of ERA and NRDAR Processes - Example

- Invite Trustees and EPA to attend
- Invite Trustee input on ERA Team
- Invite Trustees to present studies conducted under NRDAR



Rookery on Rabbit Island, Cameron Parish, LA  
Photograph by Pete Tuttle/FWS



## Integration of ERA and NRDAR Processes – Example (cont'd)

- Convene a workshop
- Clearly defined workshop goals and objectives
- Provided background material in advance





## Integration of ERA and NRDAR Processes – Example (cont'd)

- Used group facilitation techniques
- Prepared workshop summary report
- Invited players to review and comment on summary report





# Benefits of a Group Workshop

- Established long-term ecosystem goals and objectives
  - *Basis for remedial action objectives and restoration goals*
- Defined goals and objectives of Remedial Investigation/Feasibility Study (CERCLA clean up process)
- Allowed Trustees to evaluate data gaps for the damage assessment



## Benefits of a Group Workshop (cont'd)

- Allows Trustees opportunities to minimize redundant sampling (piggy-back studies)
- Fostered trust between risk managers and Natural Resource Trustees



Lonsdale Drive-In Restoration  
Photograph by Ken Munney/FWS



## Summary

### Risk Assessment

1. **Assesses risk of potential injury**
2. **Basis for selecting cleanup alternatives**
3. **How risky the response action itself is to trust resources**
4. **Assesses residual risk after cleanup is completed**

### Injury Assessment

1. **Validates that injuries to trust resources exist:**
  - **Past**
  - **Present**
  - **Future**
2. **Evaluates extent and severity of injuries to trust resources**
3. **Establish damages**



# U.S. Fish & Wildlife Service



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